

MIS050-P02

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Crustal deformation associated with the 2010 Chile Earthquake revealed by PALSAR ScanSAR interferometry

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On 27 Feb. 2010, an Mw8.8 (Global CMT solution) great earthquake occurred in the coastal area of Chile, South America. Around the hypocentral area, the Nazca plate subducts under the South America plate with 8cm/yr, and great earthquakes of a M8 class have repeatedly occurred with the period of several 10 or a hundred years. Especially, this earthquake occurred around the hypocentral areas of the 1928 (M8.3) and the 1938 (M8.3) earthquakes, and there is a possibility that these asperities ruptured in this earthquake. Then we applied SAR interferometry using ALOS/PALSAR data to detect crustal deformation associated with this earthquake.

In this analysis, we use ScanSAR data observed from descending orbit at 10 Apr. 2008 and 1 Mar. 2010. Since SAR interferometry detects a relative slant range change in the image, ScanSAR interferometry can efficiently detect crustal deformation occurred in a broad area. Large gradient of slant-range extension in area of 600km in north-south and 200km from the coastline was found around the epicenter. The slant-range change around the epicenter relative to Santiago exceeded 3 m. Santiago IGS station was moved 30cm in this earthquake, and therefore it is expected that the absolute slant-range change is larger. Peaks of slant-range extensions are located to the north and the south of the epicenter, indicating that rupture areas were located in these areas.

Furthermore, these are consistent with hypocentral areas of the 1928 and the 1939 earthquakes, and it supports the possibility that these asperities were ruptured in this earthquake.

Keywords: Chile earthquake, crustal deformation, interferometry, InSAR, ScanSAR, PALSAR